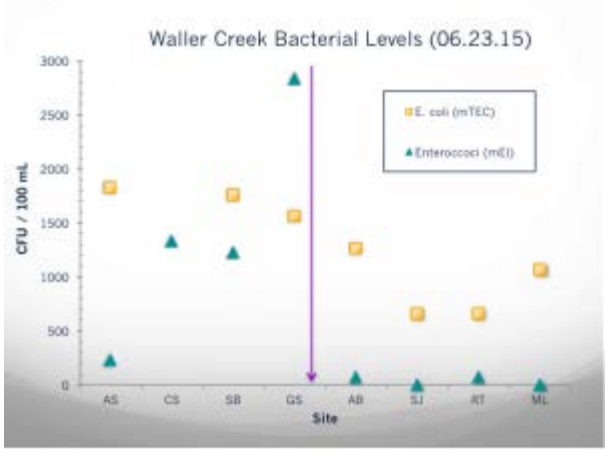
DIY, High Schoolers, and EHS collaborating to protect Waller Creek.

For almost two years now the DIY Diagnostics Research Stream has been monitoring Waller Creek along campus in the lookout for bacterial hotspots and attempting to identify the sources of these. I had the opportunity of joining the DIY Diagnostics Stream in 2014 and have been one of the Waller Creek investigators since then. I had honestly never really thought about Waller Creek before, even though it is right there in our main campus. Nevertheless, my time working on Waller Creek has made it clear to me that it deserves more attention than it currently gets. I'm honored to have received a Waller Creek Conservancy / Winkler Family Foundation fellowship through the Freshman Research Initiative to continue my research on Waller Creek.

The sites that we mainly focused on were located in the northern part of campus, where testing had proven high levels of fecal bacteria. Our tests consist of two stages; first we determine whether there is bacteria at any given site by using culture dependent techniques, which is basically giving bacteria

nutrients and food and generally an awesome environment for them to grow. If the first stage proves that bacteria are present then we move on to the second stage. The second stage consists of determining where the bacteria came from, as of now we have the ability of telling whether the source of the bacteria is human fecal matter or dog fecal matter. It might sound kind of unpleasant and maybe almost kind of creepy, but think about it. These techniques allow us to identify contaminated water and point to the problem, which can then be fixed and prevented in the future. When talking about urban watersheds, such as Waller Creek, identifying sources of pollution is crucial. Waller Creek is surrounded by the city of Austin and the chances of people coming into contact with the water are pretty high, not to mention that Waller Creek eventually discharges its water into Lady Bird Lake where we like to paddle board and kayak, some of us also like to fall off of the kayak or paddle board into what we assume is water mostly free of human/dog “you know what.”

This summer we made some pretty amazing findings with the help of a group of high school students. The DIY research crew came together to lead high school students from the UT High School Research Academy to sample simultaneously at different sites along Waller Creek. We expected the results to show the usual happy bacteria, thriving in the very polluted water of Waller Creek. To our surprise, however, our usual joyful fecal bacteria were gone at the southern sampling sites. Where did they go? I’m talking about a huge drop, one that could mean two things: we messed up the experiment or something was making the bacterial levels drop fast.



These are the values of bacteria (E.coli and enterococci) at each of the sites sampled by the high school students. The purple line represents the point at which the bacterial levels dropped.

In attempts to find an answer we searched the creek for anything that could potentially explain the drop in bacterial levels. The search was a success! Right in the area of bacterial drop there was water flowing into the creek. We went ahead and collected water from the mysterious outfall to determine if bacteria were present. And the results said: NO. The culture dependent tests indicated that the bacterial levels were zero at this suspicious outfall. We returned to sample a second time and the amount of water coming out of the outfall was still high considering it hadn't rained in more than a week. In addition, the temperature of the water from the outfall was almost 5C higher than the creek. Finally, we mixed some of the outfall water with water from a site further north that we know had high levels of bacteria. The bacterial levels of the contaminated water were cut in half!

Mysterious outfall.

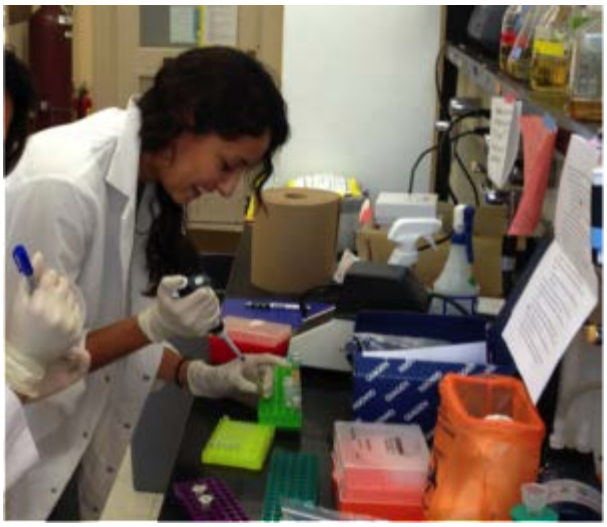
We were now convinced that the mysterious outfall was somehow lowering the bacterial levels. We contacted Environmental Health and Safety and let them know about our findings. They were extremely responsive and within two days we met with them to show them the outfall. They conducted follow up tests and contacted utilities and facilities who were able to stop the outflow of water!

DIY Diagnostics Stream and EHS

collaborating to protect Waller Creek.

Overall, this is a bittersweet story: Sweet because through scientific research we found a hazard to Waller Creek and with the help of EHS were able to stop the problem. Bitter because bacterial pollution is still a major issue in Waller Creek and needs to be addressed, especially since Austin's population is growing. The next step for us is to determine the source of pollution, which I described before as stage two, and use this information to aid in the restoration of Waller Creek and ultimately prevent future contamination.

Blog Post by Ava Ibanez:



Ava Ibanez is a student from Mexico City completing her Bachelors in Science degree in Marine and Freshwater Biology at the University of Texas at Austin. Currently, she is on her third year and expects to graduate in the Spring of 2016. She has experience with experimental design, conducting independent research, and research presentation. During 2014 Ava worked as a mentor and researcher in the DIY Diagnostics Research Stream at the University of Texas at Austin. Her research focused on assessing bacterial levels in Waller Creek and determining the source of the bacteria through culture independent techniques. Ava was then accepted into the Semester by the Sea undergraduate research program at the University of Texas Marine Science Institute in Port Aransas, where she worked on another independent research project focused on fisheries ecology in the Northern Gulf of Mexico. Most recently she took a field research class through UT at the Yucatan Peninsula in Mexico, where she led a group research project and studied the effects of tourism on the feeding behavior of herbivorous fish. In the future, Ava wishes to continue her education in graduate school as a field biologist with a focus on natural systems, such as Waller Creek, that are increasingly affected by anthropogenic and environmental factors.

The DIY diagnostics stream is a lab within the Freshman Research Initiative program (supervised by Dr. Andrew Ellington) focused on developing diagnostics for environmental and personal health. This stream is made possible by a generous donation from Bob and Cathy O'Rear. Research in Waller Creek has been funded by the FRI program, the Texas Memorial Museum via the Joseph Jones Life

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Spring 2014

DIY at the FRI picnic!

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